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VACCINATION.

SIMPLICITY is a characteristic of some of the grandest of discoveries, and of the most important utilizations of natural laws in behalf of the interests of human life. How simple seems the recognition of the law of gravitation and the extension of this law to the planetary system! The applications of the expansive force of steam in mechanics appear to-day as simple as those of water-power. At the present time, telegraphy is not more wonderful than were the phenomena of electro-galvanism half a century ago. This train of reflection arises in thinking of the discovery of vaccination. If saving human lives be a criterion of the beneficent fruits of a discovery, there is none in the history of mankind which will bear any comparison with that of vaccination. Prior to the promulgation of this discovery in 1798, small-pox was correctly called one of the greatest scourges of mankind. A late writer cites the following statistics in illustration of the fatality caused by this disease: "In England, in the seventeenth and eighteenth centuries, seven to nine per cent. of all deaths were attributable to small-pox. In Berlin, from 1783 to 1797, one-twelfth of the total mortality was due to the same. Junker computes the deaths occurring from small-pox in the year 1796, among the seven million inhabitants of Prussia, at twenty-six thousand six hundred and forty-six. In the eighteenth century, thirty thousand died annually of small-pox in France." It was a proverb at that time: "From small-pox and love but few remain free."

A vast diminution of the mortality from small-pox resulted from the discovery of vaccination. Sir James Simpson, writing in 1849, states that "during the latter half of the last century, thirty thousand individuals were computed to die annually of small-pox in England." Dr. Gregory estimated the number at about forty-five thousand. Dr. Haygarth calculated the proportion of deaths from this disease to amount annually to thirty-eight thousand in eight millions of inhabitants. In contrast with these statistics, according to Simpson, "From the official returns of the Registrar-General, it appears that at the present time (1849) the number that perish annually of this same disease is reduced to less than ten thousand." Quoting further from this author: "In England alone, therefore, the absolute mortality from small-pox is less by twenty thousand a year than it was half a century ago. If a similar rate of reduction in the number of deaths from small-pox holds good—as we have every reason to believe is the case—in the other kingdoms of Europe, then, out of the two hundred and twenty millions of people that inhabit this quarter of the globe, four hundred thousand or five hundred thousand fewer die now of small-pox than, with a similar population, would have died from this malady fifty years ago." The author adds that, according to this rate of computation, "there are preserved in Europe during a single half-century a number of lives greater in amount than the whole existing population of Great Britain." "During the long European wars connected with and following the French revolution, it has been calculated that five or six millions of human lives were lost. In Europe, vaccination has already (1849) preserved from death a greater number of human beings than were sacrificed during these wars." It is not necessary further to adduce facts to substantiate the statement that, of all past discoveries, vaccination is beyond the reach of comparison when its effect upon the mortality from one of the most loathsome of diseases is considered; nor is it necessary, in connection with the beneficent effect of this discovery, to refer to an exemption from the permanent imprint of the disease on those whom it does not kill.

Looking back upon the discovery of vaccination, it has the appearance of a very simple affair. Edward Jenner, apprenticed to a surgeon in Gloucestershire, heard a young country-woman remark to his master that she could not take the small-pox, for she had had cow-pox. He was then a youth. At the age of twenty-one he went to London, and for two years he was the pupil of John Hunter, and a member of his household. Under the superintendence of that great man Jenner became, in the language of one of his biographers, "an expert anatomist, a sound pathologist, a careful experimenter, and a good naturalist." Returning to his native town as a surgical practitioner, the casual remark of the country-woman years before led him to inquire into the grounds for her statement. The expectation of scientific results, doubtless, often precedes their development. It appears to have been so in this instance, for he mentioned, in a letter to Hunter, his supposition that cow-pox, communicated to man by inoculation, might be preventive of small-pox, and got, in reply, these pithy words: "Don't think, but try." Jenner tried. Mark how simple the procedure in what has been called "a masterpiece of medical induction." He had but to ascertain that, in a certain number of instances, they who had contracted —by milking—a local affection from the udder of the cow, were insusceptible to the contagious miasm of small-pox; that the particular affection in the cow which gave this protection was indicated by a characteristic vesicle; that by inoculation with the liquid contents of this vesicle the affection was produced in man; and, finally, that they to whom cow-pox had been thus communicated were rendered thereby incapable of having small-pox by inoculation with the virus of that disease.

How natural and easy does it now seem to have ascertained these points! Yet it took Jenner twenty years to accumulate data sufficient for him to venture upon the publication of his discovery! Jenner's modesty is shown by the title of his publication, namely: "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ: a Disease Discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the Name of Cow-pox." It is noteworthy that this publication, embracing the facts on which his discovery was based, consisted of only about ten thousand words.

Vaccination for a time encountered intense prejudice and virulent opposition. Jenner, who went to London after the publication of his discovery, was unable for three months to find any person on whom he could exhibit to his medical brethren the vaccine disease. Some eminent physicians protested against it. The reigning king, George the Third, was supplicated to suppress the practice after it had made some headway. An anti-vaccination society was formed, and an appeal made to the public to second "efforts in supporting the cause of humanity against cow-pox injuries." Alleged deaths from cow-pox were published in the mortality bills of London. Society was warned against the danger of introducing "beastly diseases," which were likely to be transmitted to posterity for ages. It was asserted that the mental character would be imbruted, and instances were related of persons, after vaccination, "coughing like cows" and "bellowing like bulls." Theological objections were raised. It was argued that "small-pox is a visitation from God, but the cow-pox is produced by presumptuous, impious men; the former Heaven ordained, but the latter is a daring and profane violation of our holy religion." The practice was stigmatized as "a gross violation of religion, morality, law, and humanity." Instances occurred in which persons who had submitted to vaccination were mobbed. Its introduction into this country was attended with similar difficulties. The writer of this article believes that his father, Dr. Joseph Henshaw Flint, then a medical student, was the first person vaccinated on this side of the Atlantic; and, to avoid trouble, the vaccination was performed with great secrecy by Dr. Waterhouse, who procured the virus from Jenner.

This early prejudice and opposition did not long continue, but, strange to say, within late years, some of the objections which had become obsolete have been revived. Conceited ignoramuses have called in question the beneficence of vaccination; and efforts have been made to excite not only distrust of its efficacy as a measure of protection against small-pox, but a feeling of hostility toward it. Compulsory vaccination has been resisted as an invasion of natural rights. A spirit of antagonism is not confined wholly to the ignorant. For the most part, however, they who, as it would seem, should know better, belong to the credulous class who believe that views conflicting with those held by the medical faculty express new truths which the latter, from professional bias or jealousy, refuse to acknowledge. If I mistake not, modern opponents of vaccination who give any thought to the subject are chiefly among those who suppose that the minds of medical men are held in a kind of bondage to traditional doctrines and authoritative opinions, which constitute an insurmountable barrier against a liberal and untrammeled exercise of judgment. There are persons, and their number is not small, who are ready to adopt, without either opportunity or desire for investigation, heterodox principles in medicine for the reason that they are so, assuming that they who make it the business of their lives to endeavor to ascertain the truth in this department of knowledge are the least likely to find it. It would be easy to show that this is not an exaggerated statement.

What has the experience of the eighty years which have elapsed since Jenner's discovery taught, respecting vaccination? This question may be answered fairly in a few words.

Jenner evidently thought that a single successful vaccination would prove as permanently and completely protective against small-pox as variolation or an inoculation with the virus of the latter disease. Experience has taught otherwise. Vaccination has not always proved completely preventive, and the protection which may be complete for a time eventually diminishes. It seems to have been established that the protective efficacy of cow-pox has decreased since the time of Jenner, and it is a logical inference that the decrease is due to its transmission from subject to subject for a series of years; in other words, the so-called long-humanized vaccine virus has deteriorated. These facts Jenner could not have foreseen. Had he been able to foresee, he would probably have been less sanguine than he was in the expectation that small-pox might be driven out of existence by vaccination. It is true that when vaccination fails as a preventive measure, it modifies small-pox so as to render it almost harmless as regards both danger to life and the visible marks of the disease. But these advantages are in a measure neutralized by the fact that the contagion from cases modified by vaccination, or, as it is called, varioloid, is as capable of producing the disease in a severe form as that derived from the severest cases of small-pox; and, moreover, the dissemination of the disease is sometimes promoted by mild cases of varioloid which are overlooked, or mistaken for another disease, namely, varicella.

Experience, however, teaches the way to overcome the difficulties just mentioned, in the first place by means of revaccinations. The existence of a susceptibility to the contagion of small-pox is easily tested by revaccination, and, if the susceptibility exist, it is thereby for a certain period extinguished. The average length of time during which exemption from the disease is secured by a single vaccination is not yet determined. The period undoubtedly varies in different persons within wide limits. In order to render security as complete as possible, the intervals between revaccinations should not be too long. Too frequent revaccinations are not objectionable. It is a safe rule not to allow a longer interval than five years.

In the second place, there is reason to believe that the substitution of the so-called animal or bovine virus, for the long-humanized virus, will afford, for a time at least, security against deterioration. It is but lately that the importance of a renewal of the virus from the cow has been considered. That the bovine virus is more effective than the long-humanized virus is certain. It remains to be ascertained by the experience of future years whether its preventive efficacy is more persistent, and whether the transmission from animal to animal will, in the course of time, lead to its deterioration.

The use of the bovine virus has the recommendation of obviating the objection to vaccination on the ground of a liability to the communication of human diseases. The risk is small, but it is unequivocal. There is no foundation for the popular notion that there is danger from virus taken from subjects with feeble constitutions, and still less for the idea entertained by some that mental qualities may be communicated; but it is certain that vaccination has been a means of contracting a specific disease other than cow-pox. It is a natural suspicion that diseases occurring coïncidently with, or subsequent to, vaccinia, are attributable to the latter, but, as a rule, the connection is purely accidental. All occasion for apprehension on the score of acquiring human diseases is obviated if the virus be taken from the heifer; and this is a source of much relief to the physician, as well as to his patients. Unwarrantable suspicions of impurity in vaccine virus have often been the cause of injustice toward medical men. Our country owes a debt of gratitude to Dr. Henry A. Martin for the importation, in 1870, of virus from a case of spontaneous cow-pox, discovered in Beaugency, France, in 1866, and perpetuated through successive inoculations in heifers, under the sanction of the French Academy of Medicine, and with the aid of the French Government. The virus from this stock has been distributed throughout our country, and is now generally used instead of the humanized virus.

Will small-pox ever be blotted out of the list of existing diseases? We can imagine the supreme happiness with which Jenner entertained this expectation. Contrast his feelings with the exultation of a world-conqueror! The fulfillment of Jenner's expectation is among the possibilities. It can be fulfilled only by extending to the whole human race the security to be afforded by vaccination and revaccinations. This cannot be done except by the diffusion of knowledge of the subject, and by Governmental power. Vaccination and revaccinations must be made everywhere compulsory. If they who resist their enforcement were alone the victims of the disease, society could afford to let them die "as the fool dieth." The question is whether society shall suffer on account of their folly. The right of society to protect itself in this matter is as clear as that of placing under restraint a homicidal maniac.

Meanwhile, cases of small-pox must be effectually isolated, and thorough measures of disinfection employed, under the direction of intelligent health-officers clothed with authority sufficient to enforce their regulations. The disease may in this way be "stamped out" whenever and wherever it makes its appearance.

The practicability of stamping out small-pox was demonstrated a few years since in New York. In the winter and spring of 1877, the disease prevailed largely in that city. Efficient measures for vaccination, revaccination, the isolation of cases, and disinfection were pursued under the direction of the Health Board. The result was that from June, 1877, until April, 1879, not a single case occurred. During this period, a few cases escaped quarantine and were introduced into the city, but without communication of the disease to others. This result, and the brilliant achievement of stamping out epidemic cholera in 1866 and 1867, show what may be accomplished by sanitary science in the hands of those who, in addition to scientific qualifications, possess executive ability, together with adequate means and legal authority for carrying out efficiently preventive measures. The public will by and by come to an appreciation of how much of life and of property is to be saved by proper laws and organizations for the protection of public health. The glory of having triumphed over an invisible and deadly foe in the form of an epidemic disease is less conspicuous, but vastly more real, than that of the successful warrior. All honor to the past and present members of the New York Metropolitan Board of Health for their able and valuable services, which have been rendered without much approbation or encouragement from those for whom they have labored!

AUSTIN FLINT.